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Department of Agriculture

Graphical Report of Progress

of

Rural Electrification Administration

May 1, 1940

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Department of Agriculture

Report of Progress
of
RURAL ELECTRIFICATION ADMINISTRATION
by
H. S. Person, Consulting Economist

presented at
Fifth Annual Staff Conference
May 8-10, 1940

FOREWORD

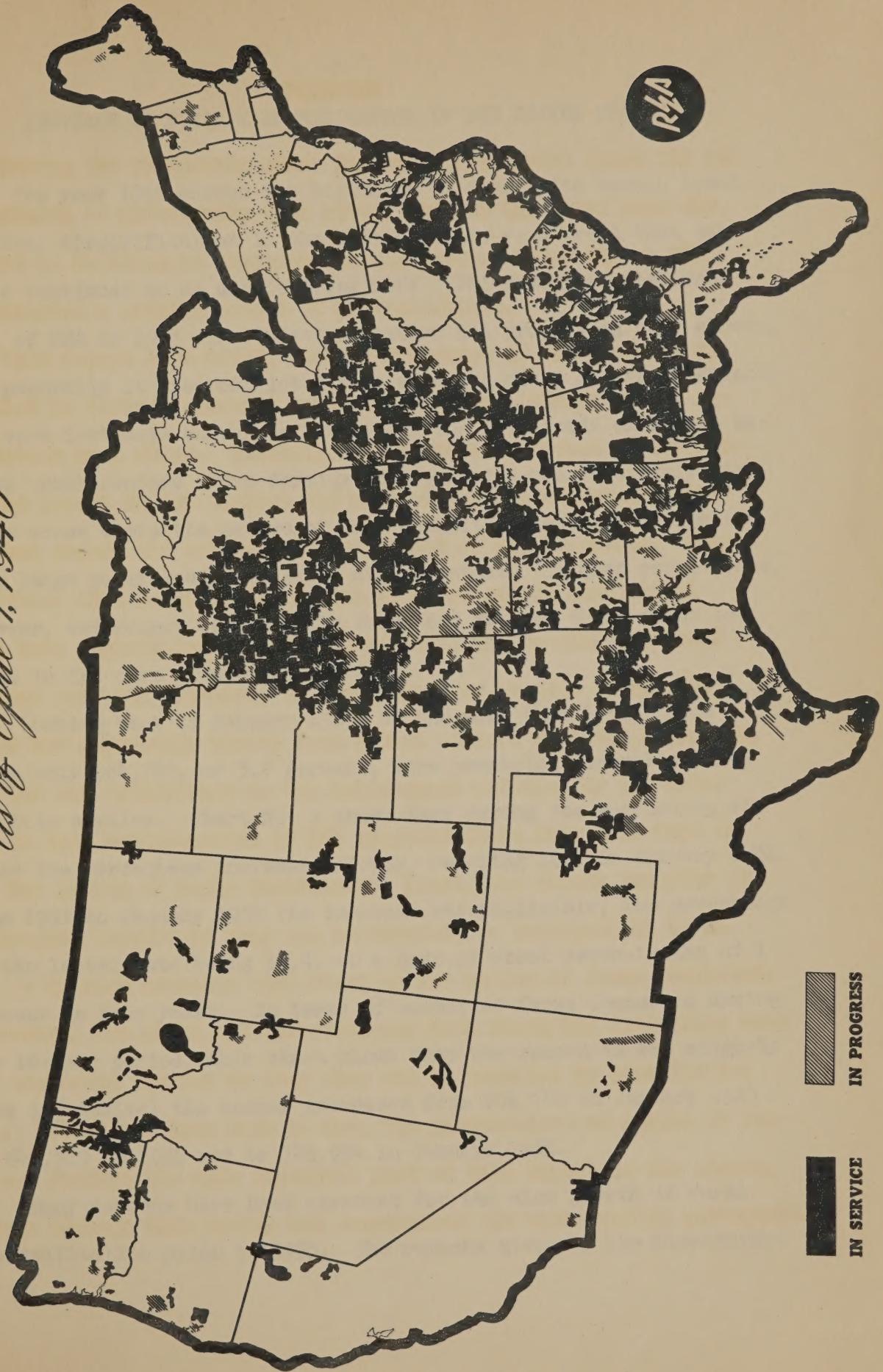
During the relatively short period of five years since its establishment -- practically four years, because the first year was devoted to building an organization and getting under way -- REA has achieved a notable record of accomplishment.

This report is a brief, factual statement of REA progress as revealed by various over-all measures of accomplishment of the organization as a whole. Generally the measures referred to throughout the report do not reflect the work of any one functional division but record the collective achievement of all divisions. Many activities that individually cannot be described in statistical terms have contributed to and made possible the results expressed by these over-all measures; in fact, there is no unit of REA, no matter how apparently remote from direct contact with REA borrowers, that has not contributed to the achievement revealed by the data.

In this consideration of REA progress there have been kept in mind two points of major importance: First, the social benefits of the program insofar as they can be measured -- inadequately to be sure -- by such over-all statistics as the number of farms connected; and second, the skill and effectiveness with which REA activities have been conducted insofar as they also can be measured by quantitative data. Effort has been made to keep the presentation as simple as possible. Perhaps the most important part of this report is the charts, because through them trends and comparisons are most readily perceptible.

RURAL ELECTRIFICATION ADMINISTRATION PROJECTS

As of April 1, 1940



IN SERVICE

IN PROGRESS

INCREASE IN RURAL ELECTRIFICATION IN THE UNITED STATES

The year 1935 marked the beginning of a definite upward trend in rural electrification in the United States -- a trend that has since continued at an accelerating rate. Prior to the establishment of REA in 1935 rural electrification had progressed very slowly, and generally it was restricted to a selected class of farm residents who were fortunate enough to live along the main roads extending between urban centers where density of population was relatively high, or in areas where the nature of farm activities, such as irrigation, made large power loads available at the outset. In most rural areas, however, extensions were usually short and favored these farms located in the more prosperous sections.

Looking back to January 1925, of the more than 6.3 million farms only 204,780, or 3.2 percent, were receiving central-station electric service. Chart No. 1 shows that during the succeeding six years the percentage increased slowly, reaching 10.2 in January 1931. From 1931 to January 1935 the increase was negligible, the percentage on the latter date being 10.9, or a gain of about seven-tenths of 1 percent in four years. In terms of number of farms connected during the 10-year period, this chart shows that the record is but slightly more impressive; the number increased from 204,780 in January 1925 to 649,919 in 1931 and to 743,954 in January 1935.

Many reasons have been advanced for the slow growth of rural electrification prior to 1935. The reasons given by the Mississippi

Valley Committee in its October 1934 report were "the lack of interest by operating companies in rural electrification, high cost of line construction because of the unnecessarily expensive type of line used, onerous restrictions covering rural line extensions, and high rates."

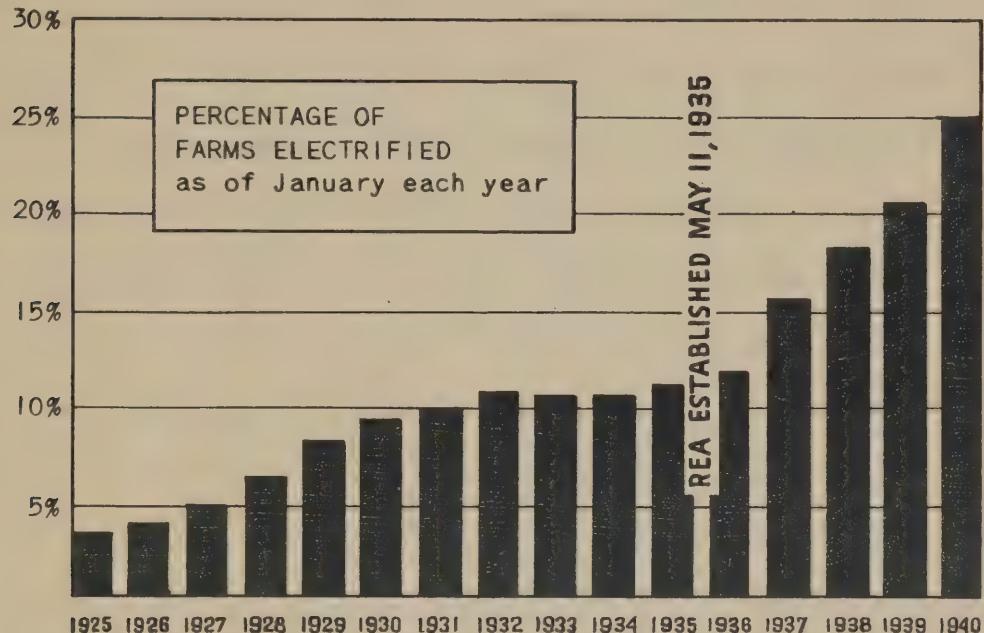
With the establishment of REA in May 1935, rural electrification received a new stimulus and, as Chart No. 1 shows, began to expand rapidly -- from 10.9 percent in January 1935 to 11.6 in 1936, to 15.4 in 1937, to 18.2 in 1938 to 20.6 in 1939 and to 25.0 in January 1940. Today, there are over 1,700,000 farms with electric service, or about $2\frac{1}{2}$ times as many as when REA was established.

These statistics indicate that substantial progress is being made in electrifying the rural areas of the United States. In addition to the direct contribution of REA to this progress through providing funds for financing the construction of rural electric systems, the REA program has exerted considerable influence on private companies by stimulating a renewed interest on their part in extending electric service to farmers. This, in part, has resulted from the demonstration by REA that adequate, economical electric service can be rendered over wide rural areas at rates and under conditions that farmers can afford to pay.

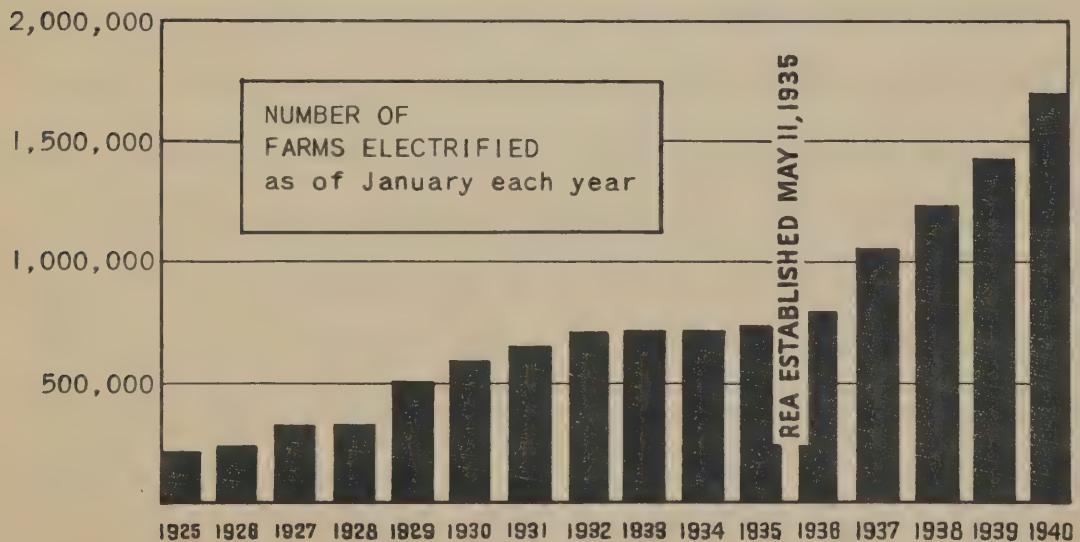
However, there are over 5,000,000 farms still without electric service.

INCREASE IN RURAL ELECTRIFICATION IN THE UNITED STATES

The percentage of electrified farms increased from 10.9 in 1935 to 25 in 1940. During the 5 years prior to REA, the increase was negligible — about seven-tenths of one percent.



The number of electrified farms is now about $2\frac{1}{2}$ times as many as when REA was established. The Government's program has stimulated rural electrification; farmers are now obtaining electric power in areas where service had previously been denied by excessive rates and other onerous conditions. However, the task is only begun — more than 5 million farms are still without electric service.



PROGRESS IN REA ACTIVITIES -- GENERAL

The growing importance of the Government's rural electrification program, and the accompanying increase in the magnitude of REA activities, are shown clearly by the increase in total allotments and the number of rural residents that will be enabled eventually to obtain electric service. Chart No. 2 shows the steady growth in these figures from year to year. It can be seen that by April 1, 1940, total allotments of \$269,740,793 had been made to 691 borrowers to make service eventually available to about 856,000 farmers and other rural consumers. This should be compared with \$229,698,000 to 632 borrowers on July 1, 1939; \$89,565,000 to 367 borrowers on July 1, 1938; \$61,148,000 to 266 borrowers on July 1, 1937; and \$15,050,000 to 66 borrowers on July 1, 1936.

The fact that over 92 percent of these allotments have been made to non-profit enterprises is of far-reaching significance. We should not fail to call attention to the importance of a new type of cooperative through which the citizens of a community own and operate electric systems for their benefit; a type of cooperative that promotes community consciousness and community spirit, and that contributes to the strengthening of local self-government.

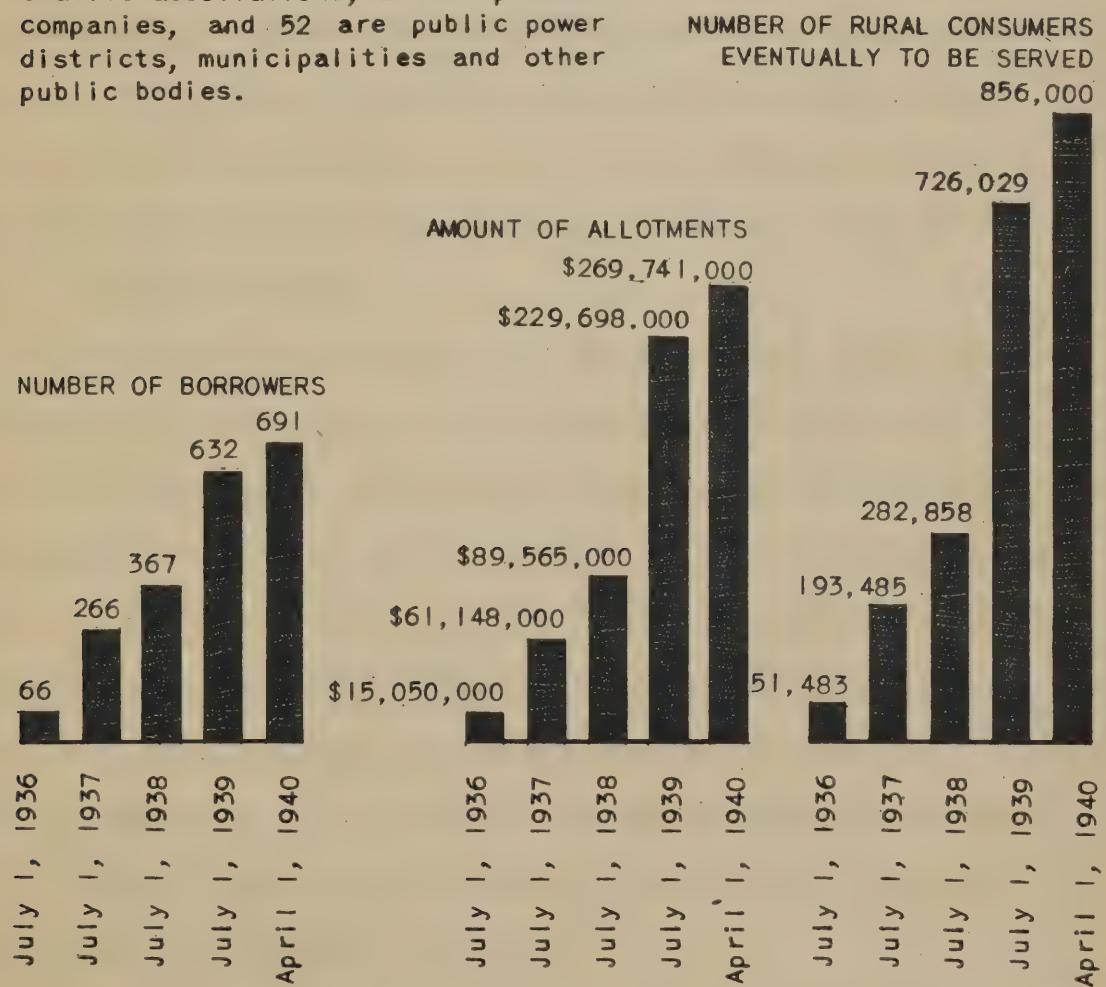
The desire for electric service by farmers on reasonable terms is increasing. Applications on hand or known to be in preparation in the field totaled \$65,768,200 on April 1, 1940.

PROGRESS IN REA ACTIVITIES -- GENERAL

The Government's rural electrification program is growing steadily in importance: by April 1, 1940 REA had made allotments totaling \$269,741,000 to 691 borrowers located in 45 states for lines designed to make electric service available to 865,000 rural consumers.

Since July 1, 1939 improved methods and procedures have made it possible for the first time, for REA to allot substantially all of its current year's loan appropriation during the first six months of the fiscal year, thereby permitting many borrowers to take advantage of favorable weather conditions for line construction. In previous fiscal years, allotments were made more slowly throughout the year with the consequence that weather conditions compelled many farmers to wait unnecessarily long periods before the construction of lines could be completed.

Of the 691 borrowers, 615 are cooperative associations, 24 are private companies, and 52 are public power districts, municipalities and other public bodies.



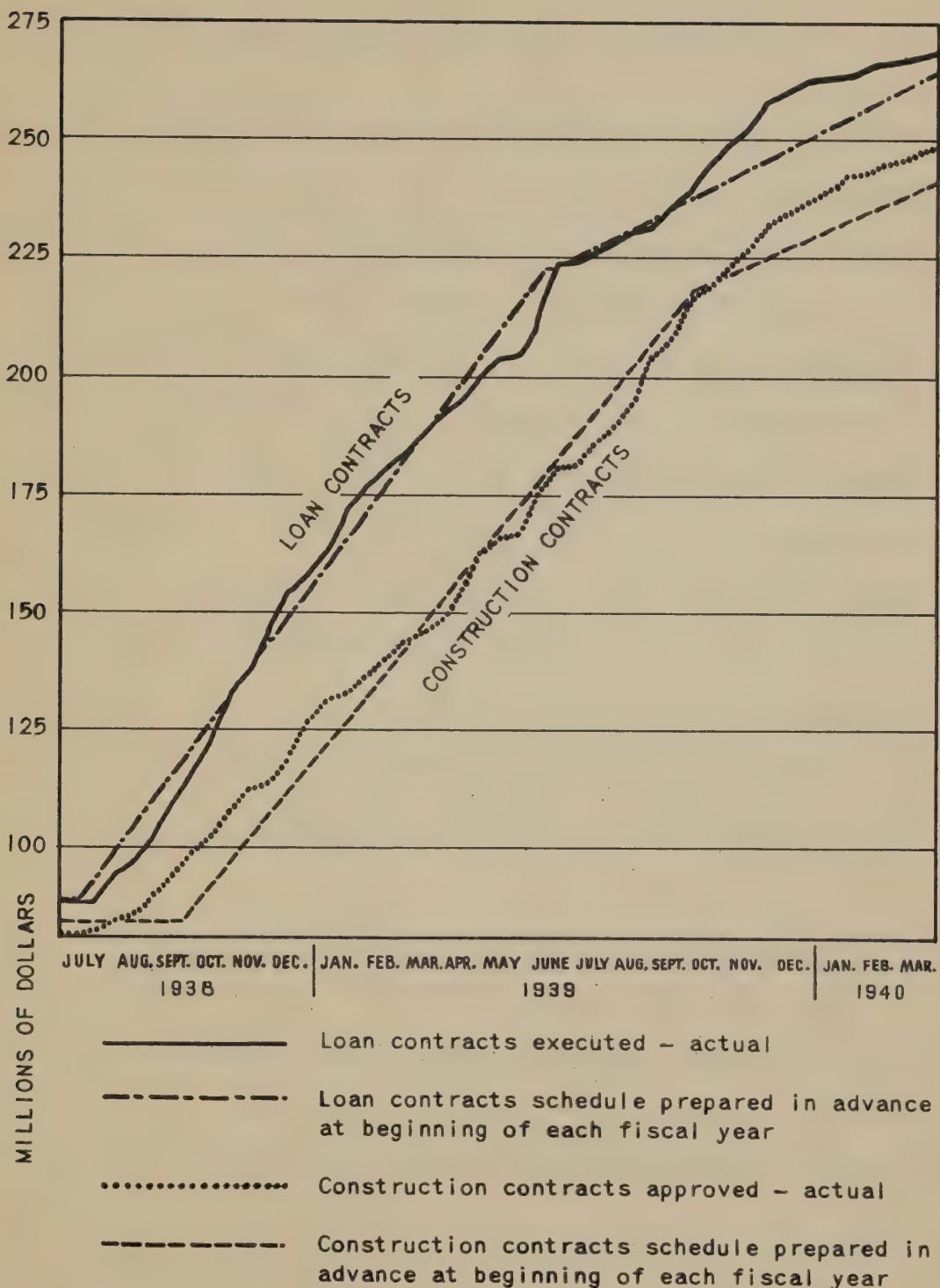
PROGRESS IN REA ACTIVITIES -- RELATION OF ACTUAL TO SCHEDULED PERFORMANCE

One of the best evidences of the effectiveness with which the staff of REA conducts and coordinates its activities is found in the fact that actual performance follows very closely and is frequently ahead of the schedules prepared at the beginning of each fiscal year. Chart No. 3 shows that during the present fiscal year the construction activities of REA have been maintained very closely to schedule and at the present time are considerably ahead of schedule. The curve for Loan Contracts Executed moved ahead of schedule in September 1939 and has maintained that position. The curve for Construction Contracts approved went ahead of schedule in October 1939 and has steadily advanced.

The scheduling of operations and the maintenance of records of performance are among the outstanding techniques employed by progressive enterprises to control and coordinate their activities. These practices have been used by the more advanced business enterprises for a number of years, but only in recent years have they been adopted by Government agencies. Introduced into REA early in 1937, these practices have been refined and perfected continuously through experience. It can be said with modesty that the application of these techniques by REA compares favorably with those of the more progressive business enterprises.

PROGRESS IN REA ACTIVITIES —
RELATION OF ACTUAL TO SCHEDULED PERFORMANCE

These curves show clearly that the work of REA is ahead of schedule.



PROGRESS IN REA ACTIVITIES -- CONSTRUCTION

The total number of miles of line constructed by REA systems to date is sufficient to encircle the earth at the equator almost nine times. By the middle of April 1940 there had been built by these systems, in terms of weighted construction, a total of 224,860 miles of line. Chart No. 4 presents graphically the increase in total miles of line constructed and the construction for each week from July 1, 1938, to date. This chart shows the tremendous increase in construction that resulted from the extraordinary \$140,000,000 loan appropriation of fiscal 1939. It is of interest to note the high sustained rate of production throughout the fall and winter of 1939, particularly during November and December when the daily rate reached the highest on record, over 500 miles, or the equivalent of a new local distribution system constructed each working day.

By April 19, 1940 there were about 22,000 miles of line yet to be constructed, and, with favorable weather conditions, these should be completed within the next few months. From the viewpoint of miles of line constructed and lines yet to be built, the record indicates that the REA program is in the best condition it has ever been.

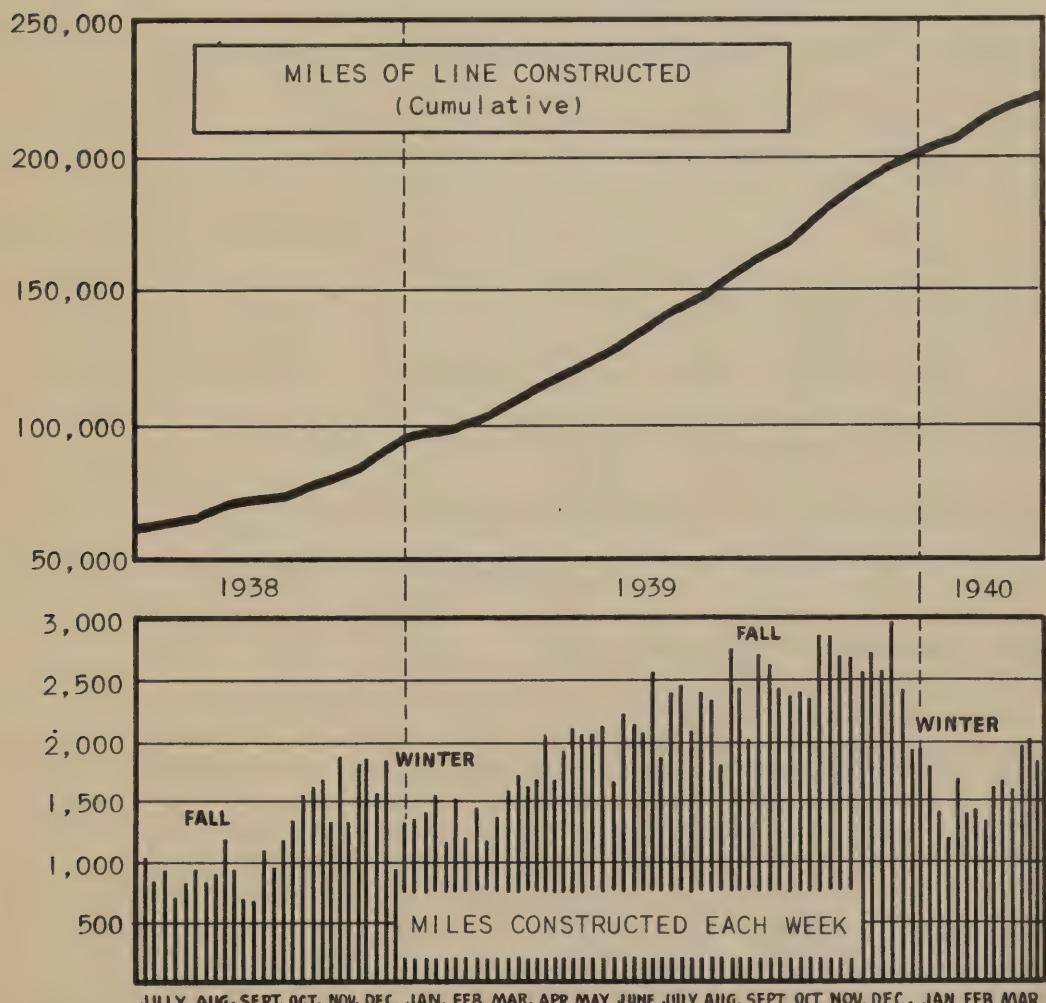
PROGRESS IN REA ACTIVITIES -- CONSTRUCTION

Line construction by REA borrowers is steadily increasing; a total of 223,365 miles on April 5, 1940.

Construction during the past 9 months was at the highest rate ever achieved by REA. Between July 1, 1939 and March 31, 1940, a total of 84,290 miles of line was constructed, an average of 9,365 miles per month, in comparison with the monthly average of 7,763 miles between January 1, 1939 to July 1, 1939, and an average of 6,318 miles per month between July 1, 1938 and July 1, 1939.

During November and December of 1939 the rate of construction reached an all-time high, averaging over 500 miles of line per day.

Attention is called particularly to the weekly construction chart at the bottom of the page.



PROGRESS IN REA ACTIVITIES -- REDUCTION IN COSTS PER
MILE OF BORROWERS' SYSTEMS

Continuous decline in the cost per mile of borrowers' systems, as shown by Chart No. 5, is of particular significance because it means that the potential area of economical rural electrification is constantly being broadened. Lower costs mean lower power bills; and lower power bills mean that more farmers can afford electric service. By designing rural lines to meet rural needs, by simplifying and standardizing designs and materials, and by placing construction on a mass-production basis, the average cost of REA lines has been reduced to about one-half the reported cost of the urban-type lines generally constructed in rural areas during the years immediately preceding the establishment of REA. These economies have not been achieved by inferior design or construction; REA line design is now followed generally throughout the country by the private industry as well as by REA borrowers.

Since 1935 the over-all costs per mile of REA borrowers' systems have been declining and, as Chart No. 5 shows, this decline has continued throughout the last 6 months of 1939 when over-all per mile costs dropped to a new low of \$754. In individual cases, construction costs as low as \$425 a mile have been achieved.

The efforts of REA to make electric service available to all farmers within an area regardless of their income status have resulted in the development of new equipment. Of particular importance

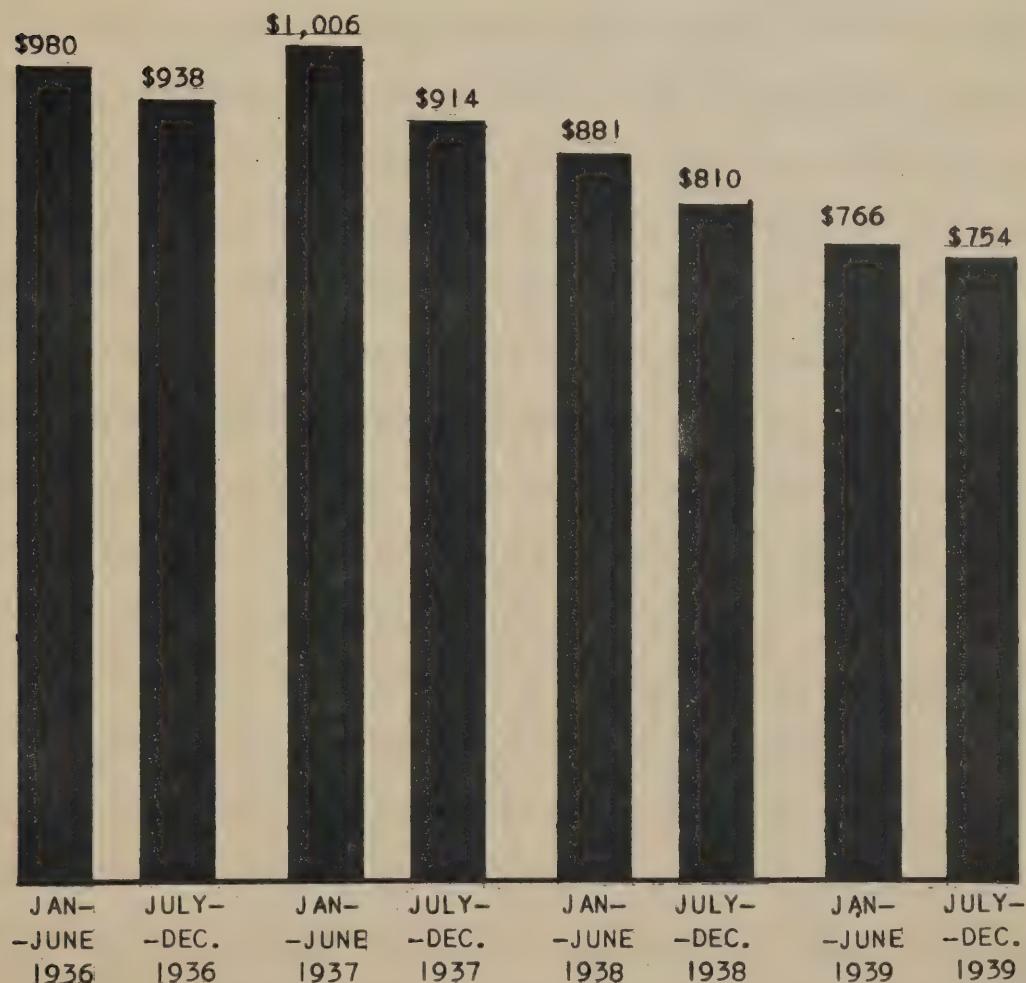
is the new low-cost service which will enable farmers of very limited income -- for example, sharecroppers and small tenant farmers -- to enjoy limited electric service for a minimum charge of about \$1 a month. Developments of this type are in direct contrast to prevailing practices of the utility industry of extending costly urban-type construction and using only costly urban-type appliances in rural areas, and therefore of serving only the more prosperous farmers within an area and disregarding all others.

PROGRESS IN REA ACTIVITIES -- REDUCTION IN COSTS PER MILE OF BORROWERS' SYSTEMS

The substantial reduction in the cost of rural lines is one of the outstanding achievements of REA. The average overall cost of REA lines is now about \$800, or approximately one-half of the reported average costs of \$1,500 to \$1,800 a mile which were common before REA was established.

The average construction cost of REA lines is considerably less than overall costs and shows the same downward trend. During the last 6 months of 1939 the average construction contract cost was \$648 a mile in contrast to \$865 in 1937.

Reduction in line costs has been achieved without any impairment of quality or durability of construction. Today REA rural line design is being adopted generally throughout the country by all utility enterprises.



PROGRESS IN REA ACTIVITIES -- PAYMENTS FOR LABOR AND MATERIALS

The amount of funds advanced to borrowers by the Treasury Department has averaged for the past nine months nearly 10 million dollars a month, the highest rate ever achieved. By April 19, 1940, REA borrowers had been advanced a total of \$206,056,531. This compares with cumulative advances of \$122,338,000 on July 1, 1939, \$60,500,000 on July 1, 1938, and \$12,401,000 on July 1, 1937. The substantial increase in the average monthly amount of funds being advanced currently, as shown by Chart No. 6, reflects the revision and simplification of procedures that have been instituted during the past year in the establishment of budgetary controls, the handling of inventories and field audits, and the processing of requisitions. One result of these improvements is that contractors now receive their final payments about 27 weeks earlier than formerly. During recent months, for the first time in REA experience, the work of handling requisitions for funds has been on a current basis and there is no longer a backlog of delayed requisitions.

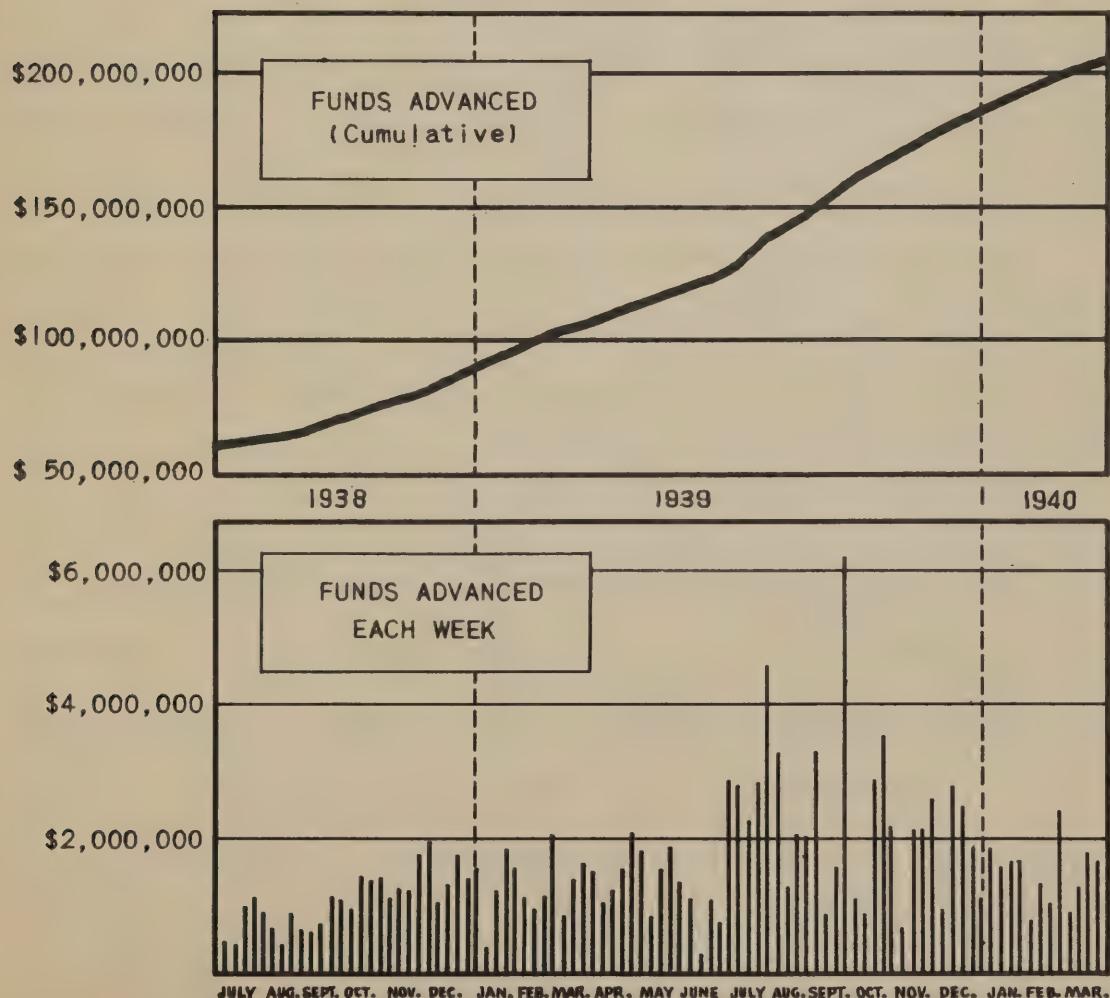
The amount of funds advanced to borrowers is an excellent measure not only of the progress of REA activities in extending rural electrification but also of the funds that are flowing out to labor and industry. The expenditure of \$206,000,000 for rural electrification has created a new market for manufacturers and has contributed substantially to the maintenance of employment in many localities from which poles and other items of equipment are obtained.

PROGRESS IN REA ACTIVITIES —
PAYMENTS FOR LABOR AND MATERIALS

By April 1, 1940, REA had advanced funds totaling \$203,148,846.

The amount of funds advanced for labor and materials between July 1, 1939 and March 31, 1940 was at the highest rate ever attained by REA. During this 9-month period, funds advanced totaled \$80,811,021, an average of \$9,979,000 a month, in contrast with a monthly average of \$5,665,000 between January 1, 1939 and July 1, 1939, and of \$5,191,000 between July 1, 1938 and July 1, 1939.

Through increased efficiency the time between requisition and advance of funds has been reduced from about 5 weeks to one week. With this increased efficiency there has been obtained also a better control over expenditures through the development of budgetary procedures.



PROGRESS IN REA ACTIVITIES -- INCREASES OF MILES OF LINE
ENERGIZED AND RURAL CONSUMERS CONNECTED

By March 1, 1940, there were 481,362 farms and other rural consumers receiving service from the 198,626 miles of energized lines of REA borrowers' systems. During the 8 months between July 1, 1939 and March 1, 1940, the energized lines of these systems increased at the average rate of 10,453 miles a month, which is of course a result of the large construction program that has been under way during the past year. It is of interest to note that during the same 8-month period, the number of rural residents receiving service increased at the average rate of 26,670 a month. As can be seen from Chart No. 7, the rate of increase during the months of the present fiscal year is the highest ever achieved. During the 12-month period between July 1, 1938, and July 1, 1939, the average increase in miles energized was 6,250 miles a month and the increase in consumers connected was 14,000 a month.

It is estimated that by the end of the lending program as established by the Rural Electrification Act, electric service will have been made available to almost one and one-half million farm residents and other rural residents by REA-financed lines alone.

The membership campaigns which have recently been conducted by many of the borrowers have resulted already in a substantial increase in members, a corresponding improvement in consumer density,

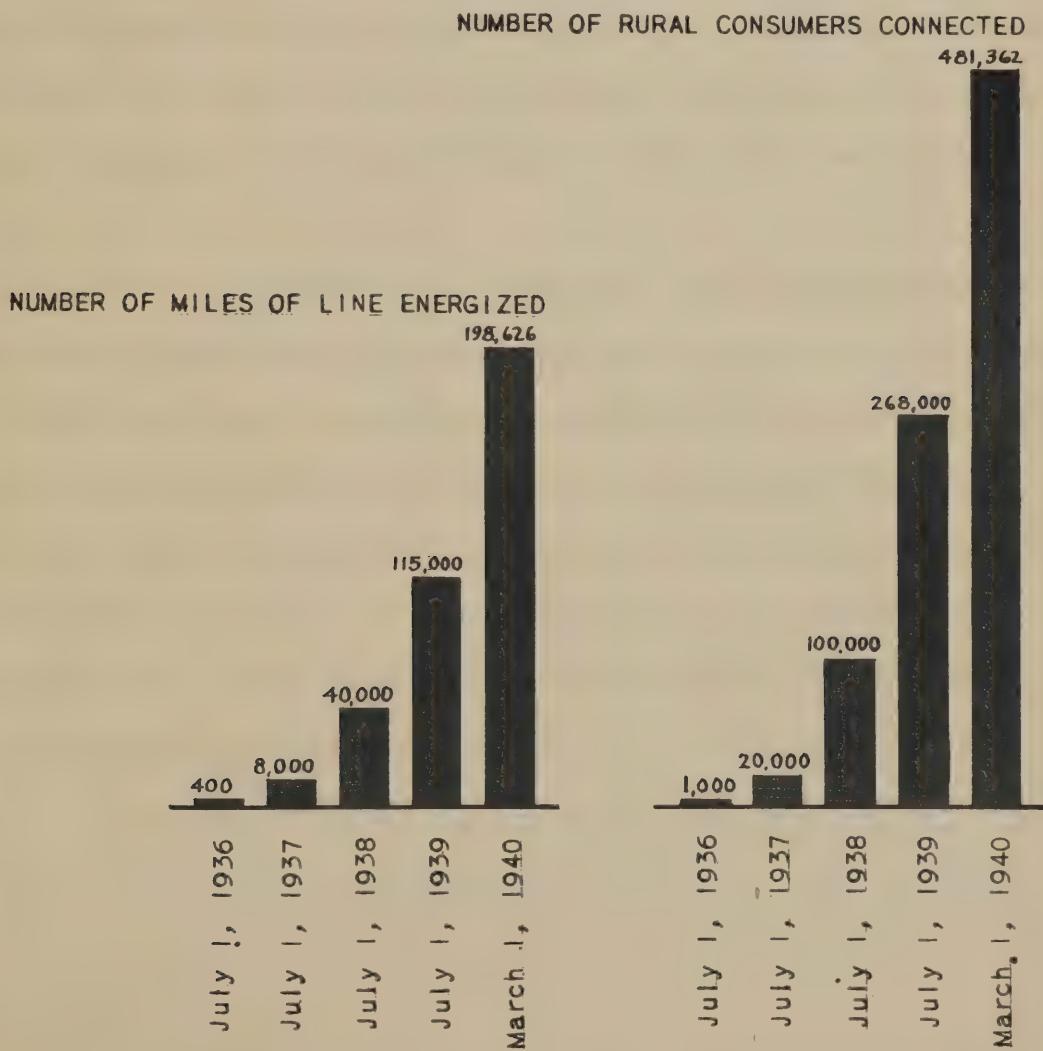
and a substantial increase in the annual revenues of borrowers' systems. By April 25, 1940, the 360 participating borrowers' systems reported that a total of 22,825 new members had been obtained as a result of this campaign. Of this total, 16,019 were rural residents who previously had never signed an application for membership and service, and 6,806 were rural residents who previously had signified their intention to take service but never had wired their premises. It is estimated that the addition of these new members will increase the annual revenues of borrowers by more than \$800,000, assuming an average monthly bill of \$3.00 for each of the consumers gained.

In addition to the direct results achieved to date, there are other significant effects of the membership campaign that should be mentioned. Reports from borrowers indicate that directors and superintendents have been made more keenly aware of the importance of improving member density and that increasing density on existing lines means both decreased investment and lower debt service requirements per consumer. It is of interest to note also that 188, or over 52 percent, of the participating borrowers have reported their intention to continue the campaign.

PROGRESS IN REA ACTIVITIES -- INCREASE OF MILES OF LINE
ENERGIZED AND RURAL CONSUMERS CONNECTED

Since July 1, 1939 the increase in the number of miles of line energized by REA borrowers has been at an accelerated pace. Between July 1, 1939 and March 1, 1940 a total of 83,626 miles of line was energized, a monthly average of 10,453 miles, in contrast to a monthly average between July 1, 1938 and July 1, 1939 of 6,250 miles.

The number of rural consumers receiving electric service from REA borrowers also has been increasing rapidly, reaching a total of 481,362 consumers on March 1, 1940. Of this total, 213,362 were connected between July 1, 1939 and March 1, 1940, an average of 26,670 a month. This compares with an increase of 14,000 consumers per month between July 1, 1938 and July 1, 1939.



PROGRESS IN REA ACTIVITIES -- PAYMENTS BY BORROWERS, INTEREST
DUE AND PAID RECONSTRUCTION FINANCE CORPORATION, AND CASH
BALANCE AVAILABLE FOR FUTURE PAYMENTS

REA borrowers are similar to most new businesses in that they must go through an initial operating period before they can establish themselves on a financial basis capable of meeting their obligations. As is true of practically every new business enterprise, the revenues during this initial operating period frequently are not sufficient to cover all capital charges. In recognition of this situation the Congress authorized the Administrator to defer payments by REA borrowers for as long as 5 years if he should deem it advisable.

Of the 691 borrowers of REA funds, not much over 20 percent of their systems have been energized long enough and completely enough to be considered well-rounded-out, going concerns. Of the remaining 80 percent, about 15 percent are not yet energized and the others are partially energized and partially in the construction stage. All of them are connecting additional farms every month, thereby improving their density and revenues. The 595 borrowers with energized lines on April 19, 1940, had an average age of but about 18 months. In view of these conditions, it is gratifying to note that already a substantial number of borrowers with energized lines -- roughly one-half of them -- have made interest or principal payments out of their revenues.

An evidence of the financial results of the program to date is

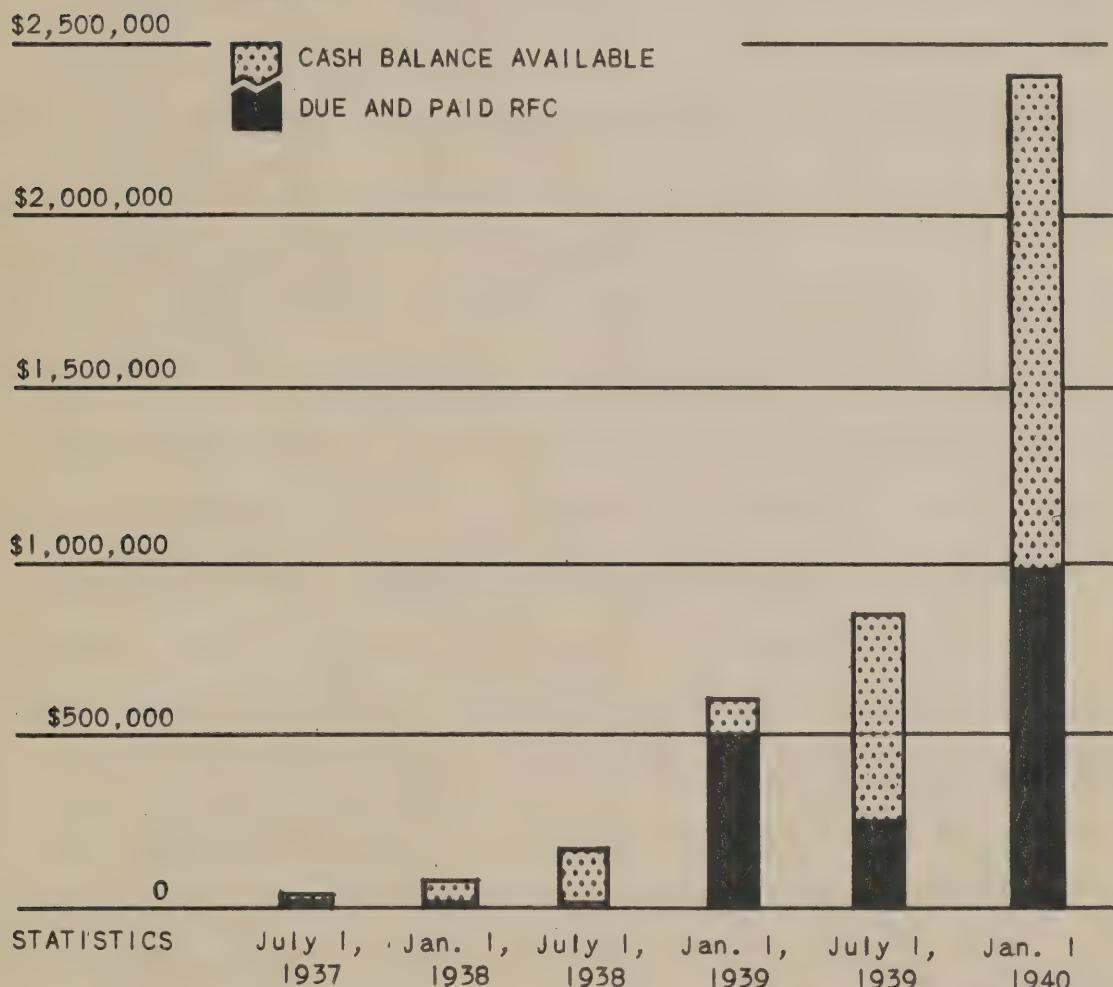
contained in the figures showing the amounts currently due the Reconstruction Finance Corporation and the amounts available to meet those payments. These figures are presented graphically in Chart No. 8. This chart and the table accompanying it show that all periodic interest payments to Reconstruction Finance Corporation have been made when due, and after each payment there has been a cash balance available for future interest payments. On January 1, 1940, after paying interest of \$992,362.70 due the Reconstruction Finance Corporation, REA had a cash balance of \$1,390,527.15 for future payments.

Because of the circumstances noted, the best indications of the progress being made by REA borrowers are the trends in borrowers' operations, a subject that will be discussed in a following section of this report.

Chart 8

PROGRESS IN REA ACTIVITIES -- PAYMENTS BY BORROWERS,
INTEREST DUE AND PAID RECONSTRUCTION FINANCE CORPO-
RATION, AND CASH BALANCE AVAILABLE FOR FUTURE PAY-
MENTS

An evidence of the financial results of the REA program to date is contained in the figures showing the amounts due RFC and the amounts available to meet these payments. As shown by the following charts and table every payment has been made to RFC and a cash balance has been available against future payments.



	July 1, 1937	Jan. 1, 1938	July 1, 1938	Jan. 1, 1939	July 1, 1939	Jan. 1, 1940
CASH AVAILABLE FROM PAYMENTS BY BORROWERS	\$19,197	47,673	152,015	597,812	834,837	2,382,889
INTEREST DUE AND PAID RFC	\$16,772	14,797	14,841	500,881	223,598	992,362
CASH BALANCE	\$ 2,425	32,876	137,174	96,931	611,239	1,390,527



SIGNIFICANT TRENDS -- PROGRESS IN OPERATIONS OF REA BORROWERS' SYSTEMS

At the present stage of development of the distribution systems of REA borrowers, operation trends are the best indicators of progress toward financial stability. If gross revenues continue to increase more rapidly than operating expenses, if consumers continue to be added to the lines, thereby improving density, and if consumption of power continues to increase, then there is no question concerning the successful operation of these systems.

In Chart No. 9 are presented the trends of a number of the more significant measures of borrowers' operations. The figures presented are averages, based on the operating reports of 541 borrowers for the month of February 1940. The trends were obtained by arranging the reported figures in age groups in accordance with the number of months that each borrower's system -- or a substantial part of it -- had been in operation. There are seven such groups, beginning with borrowers having between 1 and 6 months of operating experience and continuing by 6-month intervals until the oldest group is reached, which includes all borrowers that have been in operation between 37 and 50 months.

The averages of revenue per mile show a strong upward trend from \$5.21 for the youngest systems (1-6 months) to \$10.83 for the oldest group (37-50 months). Two principal factors account for this upward trend: The number of consumers per mile and the average revenue per consumer. Of the two, the former is the more important.

The figures showing consumption of power by residential consumers reveal that, as farmers become better acquainted with the uses of electricity, the average kilowatt-hour consumption of power increases. The average kwh. per residential consumer increases from 33.3 for the youngest systems (1-6 months) to 49.2 for systems between 19 and 24 months of age, and to 57 for the oldest systems (38-50 months). Another measure of the increasing kwh consumption is the continuous reduction in the percentage of consumers paying minimum bills. This percentage decreases from 58.9 for the youngest systems (1-6 months) to 42.5 for systems between 19 and 24 months, and to 30.4 for the oldest systems (37-50 months).

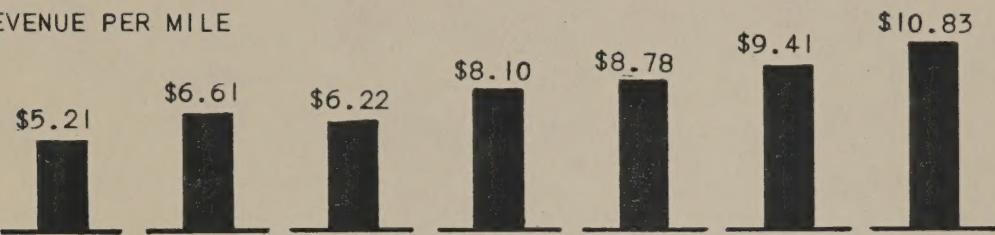
The improvement in consumer density, as systems obtain more operating experience, is apparent. The number of consumers per mile increases from 1.70 for the youngest systems (1-6 months) to 2.21 for systems between 19 and 24 months and to 2.98 for the oldest systems (37-50 months).

These trends are gratifying because they indicate that progress is being made toward successful operation. They indicate that borrowers' systems are building up more rapidly than had previously been thought probable. Judged by criteria such as these, REA borrowers show a promising future. It is recognized, of course, that these results have not come automatically but have been achieved by the collective efforts of all divisions of REA cooperating with the managements of borrowers' systems.

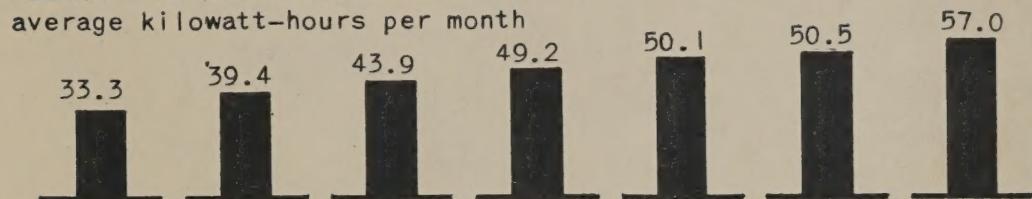
SIGNIFICANT TRENDS --
PROGRESS IN OPERATIONS OF REA BORROWERS' SYSTEMS

Trends in operating statistics are among the best measures of the progress being made by REA borrowers. The following charts, based on 541 systems, show the excellent progress being achieved by these systems as they gain experience through longer periods of operations: Increases in revenue per mile, increases in consumption of power, increases in density of connected consumers, and decreases in the percentage of minimum bill consumers.

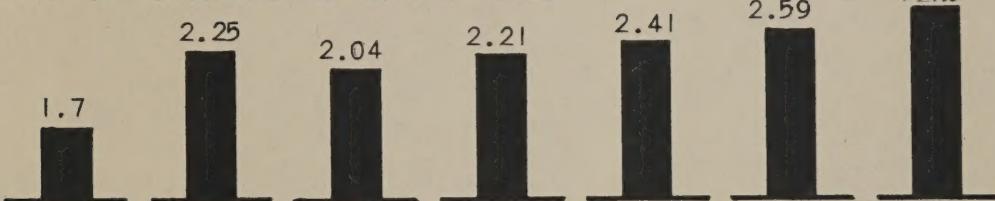
REVENUE PER MILE



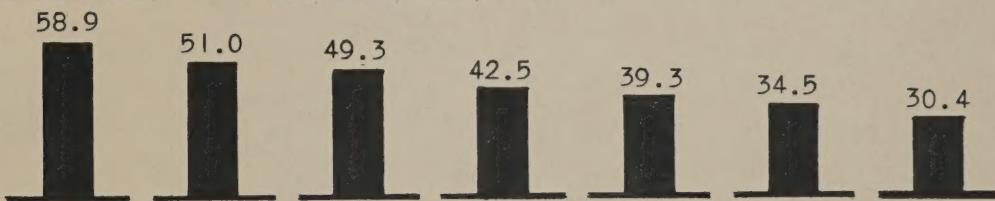
RESIDENTIAL CONSUMPTION



NUMBER OF CONSUMERS PER MILE OF LINE



PERCENTAGE OF MINIMUM BILL CONSUMERS



1 - 6 months 7 - 12 months 13 - 18 months 19 - 24 months 25 - 30 months 31 - 36 months 37 - 50 months

AGE GROUPS OF BORROWERS' SYSTEMS IN OPERATION



